A NEW SUBSPECIES OF *HASORA HURAMA* (BUTLER, 1870) (LEPIDOPTERA: HESPERIIDAE: COELIADINAE) FROM THE NORTHERN TERRITORY, AUSTRALIA

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Abstract

Hasora hurama territorialis subsp. n. is described and figured from the 'Top End', Northern Territory, Australia. Distinct differences in adult phenotype separate it from populations of the nominate subspecies *H. hurama hurama* (Butler, 1870) from Queensland, Australia and from other subspecies in the Moluccas, mainland New Guinea and adjacent islands eastwards through the Bismarck Archipelago to the Solomon Islands. The two subspecies in Australia are geographically isolated and are consistent in their character differences. *Hasora h. hurama* is newly recorded from Dauan Island, northern Torres Strait.

Introduction

Hasora hurama (Butler, 1870) ranges from the Moluccas, Aru, Biak, Maluku, through mainland New Guinea and adjacent islands and northern Australia to the Bismarck Archipelago and Solomon Islands (Evans 1949, Parsons 1998, Braby 2000, Tennent 2002). Evans (1949) recognised four subspecies but subsequently described a fifth, *H. h. diana* Evans, 1958, from Rennell Island (Evans 1958). Two subspecies occur in Papua New Guinea, with *H. h. hurama* (Butler, 1870) widespread throughout the mainland and its adjacent islands and *H. h. kieta* Strand, 1921 occurring in the Admiralties and most of the Solomon Islands (Evans 1949, Parsons 1998, Tennent 2002). In eastern Indonesia, *H. h. mola* Evans, 1949 occurs on the Bacan Islands in northern Maluku and *H. h. arua* Evans, 1934 occurs on the Aru Islands in eastern Maluku (Evans 1949). *Hasora h. diana* is restricted to Rennell and Bellona Islands in the Solomon Islands (Evans 1958, Tennent 2002). Only *H. h. hurama* has been recognised previously from the Australian subregion (Common and Waterhouse 1981, Braby 2000).

The type locality of *H. h. hurama* is Cape York, Queensland (Edwards *et al.* 2001). In Australia it has been recorded from the Torres Strait islands of Dauan (CEM in April 2015, T.A. Lambkin pers. comm. and here noted as a new northern record for Australia), Mer (Murray), Dauer and Hammond (T.A. Lambkin pers. comm.), Moa and Thursday, and on the mainland at Cape York, from Cooktown to Townsville and from the Mackay district (Common and Waterhouse 1981, Braby 2000), including the Conway Ranges near Proserpine and the Broken River near Eungella, all in eastern Queensland (Braby 2000). In the Northern Territory it has been recorded from Buffalo Creek, near Lee Point, Darwin, south through the Elizabeth River Bridge on the Stuart Highway near Noonamah, east-south-east to Fogg Dam, the Beatrice Hill region on the Adelaide River flood plain, and further

east on the Blyth River (Peters 1969, Braby 2000, Meyer *et al.* 2006) and new Nangnak outstation (Bisa 2013). Braby (2000) noted that *H. h. hurama* shows little variation throughout its range.

For many years we have suspected that there are significant differences in adult phenotype between *H. hurama* specimens from the Northern Territory and those from Queensland, warranting further examination. We consulted relevant literature and compared specimens held in our private collections with the type specimens of *H. h. hurama* (Figs 1-3), *H. h. mola* (Figs 4-6), *H. h. arua* (Figs 7-9) and *H. h. diana* (Figs 10-12) held in the Natural History Museum, London (BMNH). We concluded that the Northern Territory population warrants recognition as a distinct subspecies.

All specimens held in the author's private collections of the nominate subspecies from Queensland examined are detailed at Appendix 1. Appendix 2 details the voucher specimens of *H. h. territorialis* subsp. n. examined and used in the description of this subspecies.

Abbreviations for specimen repositories: AMC – Australian Museum Collection, Sydney; ANIC – Australian National Insect Collection, Canberra; BMNH – Natural History Museum, London; CEMC – C.E. Meyer Collection, Brisbane; DALC – D.A. Lane Collection, Atherton; MFBC – M.F. Braby Collection, Canberra; NTMC – Museum and Art Gallery of the Northern Territory Collection, Darwin; RPWC – R.P. Weir Collection, Bees Creek; SSBC – S.S. Brown Collection, Bowral.

Abbreviations for collectors: CEM – C.E. Meyer; DNW – D.N. Wilson; MFB – M.F. Braby; RPW – R.P. Weir; SSB – S.S. Brown.

Hasora hurama territorialis **subsp. n.**

(Figs 17-20)

Types: *Holotype* ♂, NORTHERN TERRITORY: Adelaide River Bridge, Bred/larva, em[erged] 4.ii.1994, C.E. Meyer (in ANIC). *Paratypes*: 3 ♀♀, Fogg Dam, 22.iv.1991, D.N. Wilson; 1 ♂, Buffalo Creek, 3.iii.1992, C.E. Meyer; 1 ♂, Adelaide River, em. 22.ix.1992, C.E. Meyer; 1 ♂, 1 ♀, same data except em. 24.ix.1992; 1 ♂, same data except em. 27.ix.1992; 2 ♂♂, same data except em. 4.ii.1994 and 5.ii.1994; 1♀, same data except em. 10.ii.1994; 1 ♀, Adelaide River Bridge on Arnhem Hwy, em. 16.iv.1995, C.E. Meyer; 3 ♂♂, same data except em. 18.ii.1995, 23.iv.1995 and 6.ix.1998; 1 ♂, Adelaide River Hunting Reserve, Arnhem Hwy, via Darwin, em. 10.iv.2009, C.E. Meyer & R.P. Weir; 1 ♂, Adelaide River Bridge environs, Arnhem Hwy, em. 3.v.2013, C.E. Meyer & R.P. Weir; 1 ♂, same data except, em. 14.v.2013; 3 ♀♀, same data except em. 14.v.2013 and 15.v.2013 (all in CEMC); 1 ♀, Adelaide River, 8.v.1989, D.N. Wilson; 2 ♀♀, Fogg Dam, 22.iv.1991, D.N. Wilson; 2 ♀♀, Berrimah Research Farm, 8.iv.1994, R.P. Weir; 1 ♀, same data except 15.iv.1994; 1 ♀, 10 km East, Adelaide River, 7.viii.1996, R.P. Weir; 1 ♂, Adelaide River, em. 6.ii.2008, R.P. Weir & S.S. Brown; 1 ♂, 1 ♀, Adelaide River, em. 5.iv.2009, R.P. Weir & C.E. Meyer; 5 ♂♂, 3 ♀♀, Beatrice Hill, em. 1.iii.2000, R.P. Weir; 2 ♀♀, Adelaide River, em. 5.iii.2013, R.P. Weir & M.J. Griffiths (all in RPWC); 2 ♂♂,

4 ♀♀, Fogg Dam, 22.iv.1991, S.S. Brown (all in SSBC); 1 ♂, Adelaide River, em. 2.v.1995, D.A. Lane & C.E. Meyer (in DALC); 1 ♀, Adelaide River, 10km NE Arnhem Hwy, 9.v.1991, D.N. Wilson (NTM I004069); 1 ♂, Beatrice Hill (Window on the Wetlands Visitor Centre), Adelaide River floodplain, M.F. Braby (NTM I004726) (both in NTMC); 2 ♂♂, 1 ♀, 12.64956ºS, 131.31851ºE, Beatrice Hill, 17.i.2009, M.F. Braby; 1 ♂, same data except 23.i.2010; 1 ♀, 12º39'36"S, 131º20'11"E, Adelaide River crssng, Arnhem Hwy, em. 15.xi.2010, M.F. Braby; 2 ♂♂, 2 ♀♀, same data except em. 17.xi.2010; 1 ♂, 1 ♀, same data except em. 18.xi.2010; 1 ♀, same data except em. 19.xi.2010; 1 ♂, same data except em. 21.xi.2010; 1 ♀, same data except em. 27.xi.2010; 1 ♂, same data except em. 7.xii.2012; 1 ♂, 12º39'36"S, 131º20'11"E, Adelaide River crossing, Arnhem Hwy, em. 12.vii.2013, M.F. Braby & L. A. Lilleyman; 1 ♀, same data except em. 16.vii.2013; 1 ♂, 12.40329ºS, 132.96107ºE, East Alligator, near Ubirr, Kakadu NP, em. 13.x.2013, M.F. Braby; 1 ♂, same data except em. 16.x.2013; 1 ♀, same data except em. 20.x.2013; 2 ♀♀, same data except em. 28.x.2013; 1 ♀, same data except em. 30.x.2013 (all in MFBC); 1 ♂, Blyth River, 21.ix.1968, F. Omer-Cooper (Reg. No: K.446984); 1 ♀, Adelaide River, 13.i.1962, T.E. Moulds (Reg. No: K.446985) (both in AMC); 1 ♀, Fogg Dam, 22.iv.1991, D.N. Wilson (in ANIC).

Description. Male (Figs 17-18). *Upperside*: dull dark chocolate-brown, with lighter brown basal hairs; forewing with an irregular dull brown-black sex-brand between vein M_3 and dorsum; head and thorax with light brown hairs; antennae black with strongly curved apiculus. *Underside*: ground colour lighter chocolate-brown than above, with forewing margins lighter brown; hindwing darker brown than forewing and generally with a purplish sheen especially in newly emerged specimens; hindwing with an uninterrupted broad white postmedian band extending from mid-costa towards the tornus turning sharply at vein 1A+2A to the inner margin; vein 1A+2A sometimes suffused with brown scales; the white band is narrowest at the costa and at its broadest between veins M_3 and CuA_2; hindwing with a dark brown-black tornal patch and a white line along the termen from the tornus to vein M_1.

Measurements (*forewing length / wingspan*): holotype 21.0 / 37.5 mm. Mean 20.9 / 37.6 mm (n = 32).

Male genitalia (Figs 24-26). The genitalia of *H. h. hurama* (Figs 21-23) and *H. h. territorialis* are overall similar. In *H. h. territorialis* the valva is not as humped posteriorly as in *H. h. hurama* and the apical dorsal margin is very angular and produced, with a short projection at the end of the inner margin, whereas in *H. h. hurama* it is more rounded. In *H. h. territorialis*, the saccus is shorter and club-shaped compared with the thin and extended condition in *H. h. hurama*. The uncus of *H. h. territorialis* is also broader and more curved and talon-like than in *H. h. hurama*. The tegumen is also more pointed in *H. h. territorialis* than in *H. h. hurama*. The aedeagi are similar in both subspecies.

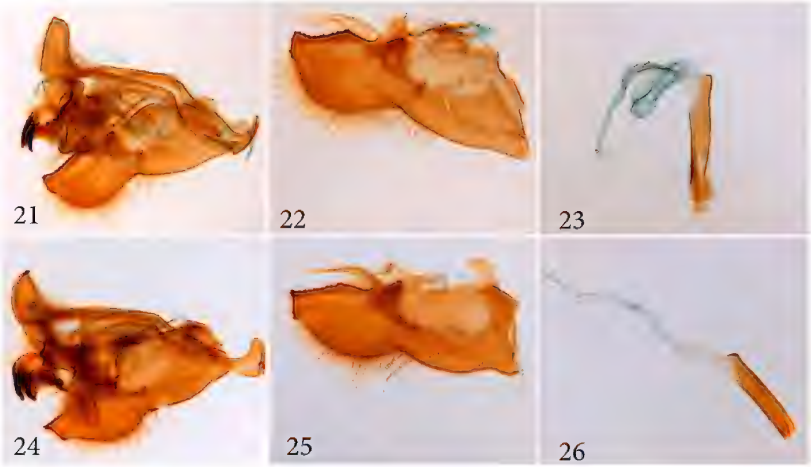
Female (Figs 19-20). *Upperside*: similar to male but without the forewing sex-brand. *Underside*: similar to male but with a slightly broader white

postmedian band and hindwing ground colour with a brighter purplish sheen. *Measurements* (*forewing length / wingspan*): 21.2 / 37.9 mm (n = 44).

Etymology. The subspecific epithet, an adjective, refers to it being found in the Northern Territory, Australia.

Figs 1-12. *Hasora hurama* subspecies type specimens from BMNH: (1) *H. h. hurama* male upperside; (2) *H. h. hurama* male underside; (3) *H. h. hurama* label data; (4) *H. h. mola* male upperside; (5) *H. h. mola* male underside; (6) *H. h. mola* label data; (7) *H. h. arua* male upperside; (8) *H. h. arua* male underside; (9) *H. h. arua* label data; (10) *H. h. diana* male upperside; (11) *H. h. diana* male underside; (12) *H. h. diana* label data. All images © Natural History Museum, London.

Figs 13-20. *Hasora hurama* subspecies from Australia: (13-16) *H. h. hurama* adults from Queensland: (13) male upperside; (14) male underside; (15) female upperside; (16) female underside. (17-20) *H. h. territorialis* subsp. n. adults from the Northern Territory: (17) holotype upperside; (18) holotype underside; (19) paratype female upperside; (20) paratype female underside.



Figs 21-26. *Hasora hurama* male genitalia: (21-23) *H. hurama hurama* from Innisfail, Queensland: (21) lateral view of tegumen, uncus and valva; (22) lateral view of valva; (23) aedeagus. (24-26) *H. hurama territorialis* subsp. n. from Fogg Dam, Northern Territory: (24) lateral view of tegumen, uncus and valva; (25) lateral view of valva; (26) aedeagus.

Diagnosis

Hasora hurama territorialis subsp. n. phenotypes (Figs 17-20) can be separated from *H. h. hurama* (Figs 1-3, 13-16), *H. h. arua* (Figs 7-9), *H. h. diana* (Figs 10-12) and *H. h. kieta* (Tennent 2002, plate 1, figs 28-29) principally by the narrower white band of the hindwing underside. It is closest to *H. h. mola* (Figs 4-6) but the white band on the hindwing underside of *H. h. territorialis* is more uniformly narrow and not as pointed at the costa. Additionally, specimens of *H. h. territorialis* generally have a purplish sheen over the hindwing underside.

Biology

Food plant. Derris trifoliata Lour. (Fabaceae).

Life history. The life history of *H. h. hurama* was first described by Manski (1940) and updated by Braby (2000). The immature stages of *H. h. territorialis* are similar to those of *H. h. hurama* as described by Braby (2000), with some minor morphological differences in larval and pupal colouring and markings. In the final instar larva of *H. h. territorialis* (Figs 27-28) the head is paler brown and the body ground colour paler pinkish-brown and lacking the prominent dorsolateral black patches on abdominal segments found in *H. h. hurama* (Fig 27). The pupa of *H. h. territorialis* (Figs 29-30) has paler abdominal segments with the spiracles pale brown as opposed to brown-black in *H. h. hurama* (Fig 29). The black mid-dorsal line on the thorax of *H. h. hurama* is lacking in the pupa of *H. h. territorialis.*

Figs 27-30. *Hasora hurama* larvae and pupae: (27) *H. hurama hurama* final instar larva dorsal view; (28) *H. hurama territorialis* final instar larva dorsal view; (29) *H. hurama hurama* pupa dorsolateral view; (30) *H. hurama territorialis* pupa lateral view.

Ecology and behaviour. Eggs are laid on the new growth of the food plant, which grows adjacent to mangroves or within mixed monsoon forest-mangrove associations. Breeding areas are in estuarine habitats along river banks in flood plains. Adults have been more commonly observed flying along the mangrove margins, with a quick jerky flight, frequently settling on the tendrils of the food plant or sticks protruding from the foliage. Once disturbed the adults quickly take flight. The larvae make a series of shelters, initially in the immature leaves, by joining the sides of the leaves together with silk and then later in the mature leaves where pupation takes place. Larvae of *H. h. territorialis*, like those of *H. h. hurama*, frequently consume all available new growth of the food plant with the availability of new growth affecting the size of the emergent adult. To date, adults have been recorded in the Northern Territory in all months of the year, with the life cycle of the butterfly being triggered by new growth on the food plant.

Discussion

Evans (1949) noted that *H. h. mola* was smaller and paler than *H. h. hurama*, having a male forewing length of 22 mm as opposed to 23-25 mm in *H. h. hurama*, and with no purple gloss on the hindwing underside. Evans (1949)

also noted that the white band on the hindwing underside in *H. h. mola* was very narrow, tapering to ½ mm at the costa. Specimens of *H. h. territorialis* are also smaller than specimens of *H. h. hurama* and also slightly smaller than those of *H. h. mola*, having an average male forewing length of 20.9 mm (n = 32), although this is probably not statistically significant. Specimens of *H. h. territorialis* generally have a purplish sheen over the hindwing underside that is absent in *H. h. mola*. The white band on the hindwing underside in *H. h. territorialis* is a different shape to that of *H. h. mola*, being more uniformly narrow, less swollen medially and not as pointed at the costa. *Hasora h. mola* is also geographically isolated from *H. h. territorialis*, occurring some 1300 km to the north of the Northern Territory.

Hasora hurama territorialis and *H. h. hurama* are allopatric and as such are reproductively isolated. *Hasora h. territorialis* is distinct in its adult phenotype and, although it shares the same food plant as *H. h. hurama*, its larval and pupal stages are morphologically different. The food plant, *Derris trifoliata*, has not been recorded from the Kimberley of Western Australia or from the Gulf Country of southwestern Queensland (AVH 2015). The male genitalia of *H. h. territorialis* are significantly different from those of *H. h. hurama*.

In Australia, adults of *H. h. territorialis* (Figs 17-20) can be separated from those of *H. h. hurama* (Figs 13-16) by the following characters. *Size*: *H. h. territorialis* is generally smaller with an average forewing length / wingspan of 20.9 / 37.6 mm (n = 32) in males and 21.2 / 37.9 mm (n = 44) in females, compared with 22.9 / 41.9 mm (n = 17) and 22.5 / 41.5 mm (n = 22) respectively in *H. h. hurama*. *Colour*: the upperside wing colour of *H. h. territorialis* is dull chocolate-brown, whereas in *H. h. hurama* it is a rich dark reddish-brown. The underside colour is also paler in *H. h. territorialis* than in *H. h. hurama*, giving the appearance of a paler insect. Wing, head and thorax hairs in *H. h. territorialis* are light brown and rarely have the greenish-bronze colouration noted by Braby (2000) in specimens of *H. h. hurama*. *Hindwing underside*: the white band in *H. h. territorialis* is approximately half the width of the band in *H. h. hurama*, being on average 2.3 mm (n = 32) in males and 2.6 mm (n = 44) in females at its widest, compared with 4.7 mm (n = 17) and 4.6 mm (n = 22) respectively in *H. h. hurama*. The white band in *H. h. territorialis* is, however, broader than in either *H. chromus chromus* (Cramer, [1780]) or *H. khoda haslia* (Mabille, 1876), both also found in Australia. The male forewing sex brand is similar in both subspecies.

The geographic isolation of the two populations of *H. hurama* in Australia has undoubtedly contributed to the observed differentiation within each region. Future surveys in coastal areas in the Kimberley region of Western Australia and in the Gulf Country of northwestern Queensland would help to understand the full extent of the butterfly's distribution across northern Australia.

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Appendix 1. Collection and external character data for *Hasora hurama hurama* specimens examined.

No. = Voucher specimen number; **A** = Forewing length (mm); **B** = Wingspan (mm), measured apex to apex; **C** = Hindwing underside band width (between veins CuA_2 and M_3); Y = yes; N = no; CEMC = CE Meyer Collection; SSBC = SS Brown Collection; RPWC = RP Weir Collection. Illustrated male (Figs 13-14) = Table 1, No. 3. Illustrated female (Figs 15-16) = Table 2, No. 5.

Table 1. Male specimens of *Hasora hurama hurama* examined.

No.	Collection data			Reared (Y/N)	A	B	C
1	Cooktown, N QLD	4.iii.1987	CEMC	Y	22.5	42.0	4.5
2	Quarantine Bay via Cooktown, QLD	19.vi.2008	CEMC	Y	22.0	41.0	4.5
3	Cooktown, QLD	11.ii.2009	CEMC	Y	22.0	42.0	5.0
4	Cooktown, QLD	18.ii.2009	CEMC	Y	23.0	42.0	5.0
5	Cooktown, QLD	18.ii.2009	CEMC	Y	21.5	40.5	4.5
6	Cooya Beach via Port Douglas, QLD	29.i.2009	CEMC	N	24.0	44.0	5.0
7	Cooya Beach via Port Douglas, QLD	29.i.2009	CEMC	N	22.0	40.0	4.0
8	Scott Street, Cairns, QLD	30.i.2009	CEMC	Y	22.0	41.0	4.0
9	Scott Street, Cairns, QLD	30.i.2009	CEMC	Y	21.5	39.0	4.0
10	Lockerbie, QLD	5-9.v.2003	RPWC	N	23.0	42.0	4.4
11	Quarantine Bay, QLD	24.vi.2006	RPWC	Y	22.0	39.0	4.0
12	Ingham, QLD (Figured in Braby 2000)	27.iii.1987	SSBC	Y	24.0	42.0	5.0
13	Ingham, QLD	27.iii.1987	SSBC	Y	23.0	43.0	5.0
14	Ingham, QLD	27.iii.1987	SSBC	Y	25.0	45.0	6.0
15	Lockerbie Scrub, Cape York QLD	10.v.2003	SSBC	N	25.5	46.0	5.2
16	Quarantine Bay, Cooktown, QLD	16.vi.2006	SSBC	Y	23.0	43.0	5.0
17	Quarantine Bay, Cooktown, QLD	25.vi.2006	SSBC	Y	23.0	41.0	5.0
Average sizes (n = 17):					**22.9**	**41.9**	**4.7**

Table 2. Female specimens of *Hasora hurama hurama* examined.

No.	Collection data			Reared (Y/N)	A	B	C
1	Cooktown, QLD	22.ix.1997	CEMC	Y	22.0	41.5	4.5
2	Cooktown, QLD	23.ix.1997	CEMC	Y	22.0	42.5	4.5
3	Cooktown, QLD	3.x.1997	CEMC	Y	23.0	42.5	4.5
4	Quarantine Bay via Cooktown, QLD	16.vi.2006	CEMC	Y	22.5	42.5	5.0
5	Quarantine Bay via Cooktown, QLD	20.vi.2006	CEMC	Y	23.5	43.0	4.5
6	Cooktown, N. QLD	4.iii.2007	CEMC	Y	21.0	41.0	4.0
7	Cooktown, QLD	12.ii.2009	CEMC	Y	21.0	38.5	3.5
8	Cooktown, QLD	17.ii.2009	CEMC	Y	20.0	37.5	4.0
9	Scott Street, Cairns, QLD	30.i.2013	CEMC	Y	23.0	43.0	4.5
10	Scott Street, Cairns, QLD	30.i.2013	CEMC	Y	21.5	40.5	4.5
11	Scott Street, Cairns, QLD	30.i.2013	CEMC	Y	22.0	40.5	4.5
12	Scott Street, Cairns, QLD	30.i.2013	CEMC	Y	22.5	40.0	4.5
13	Scott Street, Cairns, QLD	3.ii.2013	CEMC	Y	22.0	40.0	4.0
14	Cooktown, QLD	4.xi.1987	RPWC	Y	22.0	40.0	5.0
15	Quarantine Bay, QLD	24.vi.2006	RPWC	Y	22.0	37.0	3.0
16	Quarantine Bay, QLD	1.vii.2006	RPWC	Y	22.0	39.0	4.0
17	Quarantine Bay, Cooktown, QLD	28.i.2007	SSBC	N	22.5	42.0	5.0
18	Quarantine Bay, Cooktown, QLD	28.i.2007	SSBC	N	23.0	42.0	5.0
19	Ingham, QLD	17.iii.1987	SSBC	Y	23.5	44.0	5.0
20	Ingham, QLD	17.iii.1987	SSBC	Y	25.5	46.5	6.0
21	Ingham, QLD	17.iii.1987	SSBC	Y	25.0	45.0	5.5
22	Ingham, QLD	17.iii.1987	SSBC	Y	24.5	43.5	5.5
Average sizes (n = 22):					**21.6**	**39.7**	**4.4**

Appendix 2. Collection and external character data for types of *Hasora hurama territorialis* subsp. n. used for the description of the subspecies.

No. = Voucher specimen number; **R'red** or **R'd** = Reared; **A** = Forewing length (mm); **B** = Wingspan (mm), measured apex to apex; **C** = Hindwing underside band width (between veins CuA_2 and M_3); Y = yes; N = no; ANIC = Australian National Insect Collection; CEMC = CE Meyer Collection; DALC = DA Lane Collection; NTMC = Museum and Art Gallery of the Northern Territory Collection, Darwin; MFBC = MF Braby Collection; RPWC = RP Weir Collection; SSBC = SS Brown Collection. Illustrated holotype male (Figs 17-18) = Table 1, No. 5. Illustrated paratype female (Figs 19-20) = Table 2, No. 4.

Table 3. Male specimens of *Hasora hurama territorialis* subsp. n.

No.	Collection data			R'red (Y/N)	A	B	C
1	Buffalo Creek, NT	3.iii.1992	CEMC	N	21.0	39.0	2.5
2	Adelaide River, NT	22.ix.1992	CEMC	Y	21.0	39.0	2.5
3	Adelaide River, NT	23.ix.1992	CEMC	Y	19.5	39.0	2.5
4	Adelaide River, NT	24.ix.1992	CEMC	Y	20.0	35.5	2.0
5	Adelaide River, NT (Figs 17-18)	4.ii.1994	ANIC	Y	21.0	37.5	2.5
6	Adelaide River, NT	5.ii.1994	CEMC	Y	20.0	34.0	2.5
7	Adelaide River Bridge on Arnhem Hwy, NT	23.iv.1995	CEMC	Y	21.0	36.5	2.0
8	Adelaide River Bridge on Arnhem Hwy, NT	6.ix.1998	CEMC	Y	20.0	36.0	2.0
9	Adelaide River hunting reserve, Arnhem Hwy via Darwin, NT	10.iv.2009	CEMC	Y	21.5	38.0	2.0
10	Adelaide River Bridge environs, Arnhem Hwy, NT	3.v.2013	CEMC	Y	21.5	38.5	2.0
11	Adelaide River Bridge environs, Arnhem Hwy, NT	14.v.2013	CEMC	Y	20.5	38.5	3.0
12	Beatrice Hill, NT	1.iii.2000	RPWC	Y	20.0	35.0	2.0
13	Beatrice Hill, NT	1.iii.2000	RPWC	Y	20.5	35.5	2.0
14	Beatrice Hill, NT	1.iii.2000	RPWC	Y	22.0	37.0	2.5
15	Beatrice Hill, NT	1.iii.2000	RPWC	Y	22.5	38.5	2.5
16	Beatrice Hill, NT	1.iii.2000	RPWC	Y	21.5	39.5	2.0
17	Adelaide River, NT	6.ii.2008	RPWC	Y	20.0	34.5	2.0
18	Adelaide River, NT	5.iv.2009	RPWC	Y	21.5	37.5	2.0
19	Fogg Dam, NT	22.iv.1991	SSBC	N	21.5	42.0	3.5
20	Fogg Dam, NT	22.iv.1991	SSBC	N	21.5	41.5	3.2
21	Beatrice Hill (Window on the Wetlands Visitor Centre), Adelaide River floodplain, NT	14.ii.2009	NTMC	N	22.1	35.9	2.8

No.	Collection data			R'red (Y/N)	A	B	C
22	12.64956°S, 131.31851°E Beatrice Hill, NT	17.i.2009	MFBC	N	21.7	39.8	2.3
23	12.64956°S, 131.31851°E Beatrice Hill, NT	17.i.2010	MFBC	N	21.2	39.0	2.2
24	12.64956°S, 131.31851°E Beatrice Hill, NT (MFBC 00116)	23.i.2010	MFBC	N	21.3	37.6	2.2
25	12°39'36"S, 131°20'11"E Adelaide River crssng, Arnhem Hwy, NT	17.xi.2010	MFBC	Y	21.6	37.8	2.2
26	12°39'36"S, 131°20'11"E Adelaide River crssng, Arnhem Hwy, NT (MFBC 00582)	17.xi.2010	MFBC	Y	21.3	39.3	2.3
27	12°39'36"S, 131°20'11"E Adelaide River crssng, Arnhem Hwy, NT (MFBC 00583)	18.xi.2010	MFBC	Y	20.5	37.2	2.2
28	12°39'36"S, 131°20'11"E Adelaide River crssng, Arnhem Hwy, NT (MFBC 00584)	21.ix.2010	MFBC	Y	20.0	36.8	2.0
29	12°39'36"S, 131°20'11"E Adelaide River crossing, Arnhem Hwy, NT (MFBC 00824)	7.xii.2012	MFBC	Y	19.3	35.1	1.7
30	12°39'36"S, 131°20'11"E Adelaide River crossing, Arnhem Hwy, NT (MFBC 00582)	12.vii.2013	MFBC	Y	21.1	37.5	1.8
31	12.40329°S, 132.96107°E East Alligator, near Ubirr, Kakadu NP, NT (MFBC 00896)	13.x.2013	MFBC	Y	20.2	38.3	2.0
32	12.40329°S, 132.96107°E East Alligator, near Ubirr, Kakadu NP, NT (MFBC 00896)	16.x.2013	MFBC	Y	20.4	36.6	2.0
33	Blyth River[1]	21.ix.1968	AMC	N	20.7		2.9
Average sizes (n = 32):					**20.9**	**37.6**	**2.3**

Note 1: specimen measurement data not used in calculation of average sizes.

Table 4. Female specimens of *Hasora hurama territorialis* subsp. n.

No.	Collection data			R'd	A	B	C
1	Fogg Dam, NT	22.iv.1991	CEMC	N	22.0	38.5	3.0
2	Fogg Dam, NT	22.iv.1991	CEMC	N	21.0	38.5	3.0
3	Fogg Dam, NT	22.iv.1991	CEMC	N	22.0	39.0	3.0
4	Adelaide River, NT (Figs 19-20)	24.ix.1992	CEMC	Y	21.0	39.0	3.0
5	Adelaide River, NT	10.ii.1994	CEMC	Y	21.0	39.0	3.0
6	Adelaide River Bridge on Arnhem Hwy, NT	16.iv.1995	CEMC	Y	20.0	35.0	2.5
7	Adelaide River Bridge on Arnhem Hwy, NT	18.iv.1995	CEMC	Y	20.5	35.5	2.5
8	Adelaide River Bridge on Arnhem Hwy, NT	18.iv.1995	CEMC	Y	20.5	35.5	2.5
9	Adelaide River Bridge on Arnhem Hwy, NT	18.ix.1998	CEMC	Y	20.0	36.0	2.5
10	Adelaide River Bridge environs, Arnhem Hwy, NT	13.v.2013	CEMC	Y	21.0	38.0	2.5
11	Adelaide River Bridge environs, Arnhem Hwy, NT	14.v.2013	CEMC	Y	20.0	36.0	2.5
12	Adelaide River Bridge environs, Arnhem Hwy, NT	15.v.2013	CEMC	Y	21.0	38.0	2.5
13	Adelaide River, NT	8.v.1989	RPWC	N	22.0	39.0	2.5
14	Fogg Dam, NT	22.iv.1991	RPWC	N	22.5	38.0	2.5
15	Fogg Dam, NT	22.iv.1991	RPWC	N	22.5	38.5	3.0
16	Berrimah Research Farm, NT	8.iv.1994	RPWC	N	23.0	41.5	3.0
17	Berrimah Research Farm, NT	8.iv.1994	RPWC	N	21.5	35.0	2.0
18	Berrimah Research Farm, NT	15.iv.1994	RPWC	N	23.0	40.0	3.0
19	10 km East, Adelaide River, NT	7.viii.1996	RPWC	N	21.5	36.0	2.0
20	Beatrice Hill, NT	1.iii.2000	RPWC	Y	22.0	38.5	3.0
21	Beatrice Hill, NT	1.iii.2000	RPWC	Y	22.0	37.0	2.5
22	Beatrice Hill, NT	1.iii.2000	RPWC	Y	22.0	38.5	3.0
23	Adelaide River, NT	5.iv.2009	RPWC	Y	21.0	36.5	3.0
24	Adelaide River, NT	5.iii.2013	RPWC	Y	19.0	33.0	2.0
25	Adelaide River, NT	5.iii.2013	RPWC	Y	21.0	37.0	2.5
26	Fogg Dam, NT	22.iv.1991	SSBC	N	23.0	44.0	3.5
27	Fogg Dam, NT	22.iv.1991	SSBC	N	21.0	40.0	3.0
28	Fogg Dam, NT	22.iv.1991	SSBC	N	22.0	40.2	3.0
29	Fogg Dam, NT	22.iv.1991	SSBC	N	22.5	42.5	3.5
30	Adelaide River, NT	2.v.1995	DALC	Y	21.2	37.0	2.1
31	Adelaide River, 10 km NE on Arnhem Hwy, NT	9.v.1991	NTMC	N	22.3	41.2	3.0

No.	Collection data			R'd	A	B	C
32	12.64956°S 131.31851°E Beatrice Hill, NT (MFBC 00428)	17.i.2019	MFBC	Y	21.9	38.9	2.5
33	12°39'36"S 131°20'11"E Adelaide River crssng, Arnhem Hwy, NT (MFBC 00585)	15.xi.2010	MFBC	Y	19.9	36.8	2.2
34	12°39'36"S 131°20'11"E Adelaide River crssng, Arnhem Hwy, NT (MFBC 00586)	17.xi.2010	MFBC	Y	20.9	39.4	2.7
35	12°39'36"S 131°20'11"E Adelaide River crssng, Arnhem Hwy, NT	17.xi.2010	MFBC	Y	21.9	40.6	2.8
36	12°39'36"S 131°20'11"E Adelaide River crssng, Arnhem Hwy, NT (MFBC 00587)	18.xi.2010	MFBC	Y	19.9	34.9	2.5
37	12°39'36"S 131°20'11"E Adelaide River crssng, Arnhem Hwy, NT (MFBC 00588)	19.xi.2010	MFBC	Y	20.9	38.7	2.7
38	12°39'36"S 131°20'11"E Adelaide River crssng, Arnhem Hwy, NT (MFBC 00589)	27.xi.2010	MFBC	Y	20.2	37.5	2.2
39	12°39'36"S, 131°20'11"E Adelaide River crossing, Arnhem Hwy, NT	16.vii.2013	MFBC	Y	21.4	38.9	2.0
40	12.40329°S, 132.96107°E East Alligator, near Ubirr, Kakadu NP, NT	20.x.2013	MFBC	Y	19.4	36.1	2.0
41	12.40329°S 132.96107°E East Alligator, near Ubirr, Kakadu NP, NT	28.x.2013	MFBC	Y	19.7	35.7	2.2
42	12.40329°S 132.96107°E East Alligator, near Ubirr, Kakadu NP, NT	28.x.2013	MFBC	Y	20.7	37.4	2.3
43	12.40329°S 132.96107°E East Alligator, near Ubirr, Kakadu NP, NT (MFBC 00897)	30.x.2013	MFBC	Y	20.3	36.5	1.7
44	Fogg Dam, NT	22.iv.1991	ANIC	N	20.5	36.5	2.0
45	Adelaide River[1]	13.i.1962	AMC	N	22.3		2.5
Average sizes (n = 44):					**21.2**	**37.9**	**2.6**

Note 1: specimen measurement data not used in calculation of average sizes.

MISCELLANEOUS NOTES

The following notes are abstracted from the *News Bulletin of the Entomological Society of Queensland* and appeared, with illustrations, in the Volumes and Parts indicated.

Anthene lycaenoides godeffroyi (Semper) (Lepidoptera: Lycaenidae). – Three worn females were collected on 24 January 2015 in southern Queensland, at two different locations separated by about 10 km, approximately 800 km south of the previous southern recorded limit [Cannonvale near Airlie Beach]. Several others were seen at close quarters and positively identified but not collected.

Two specimens were collected and several others identified 5 km east of Pomona and another collected 2 km south of Cooroy. All specimens seen or collected were females. The Pomona specimens were all active late morning, flying around and landing on a flowering *Albizia julibrissin* (Mimosaceae), a recorded food plant for this species. The specimens appeared to be coming from a northerly direction. No further specimens were encountered until 30 January 2015, when a further female was collected and released at the Pomona site.

All specimens collected have a prominent white patch on the forewing upperside and appear typical of specimens from Townsville and Cairns.

While *A. lycaenoides godeffroyi* is a relatively strong flier for a lycaenid, it is considered unlikely that these specimens originated from within its previously known range, given the significant distance involved. It appears more likely that the range of this species has been expanding incrementally without previous detection.

MAYO, R. – Interesting new locations for *Anthene lycaenoides godeffroyi* (Semper) in southern Queensland. – Volume **42**(10): 189 (February 2015).

Hypolimnas alimena lamina Fruhstorfer (Lepidoptera: Nymphalidae) – A single female was observed 5 km east of Pomona on 20 April 2015. This is the first specimen observed in the area since moving there in 2002. It was of the 'brown form' and appeared to be in relatively fresh condition.

Junonia orithya albicincta Butler (Lepidoptera: Nymphalidae) – Three males were observed 5 km east of Pomona on separate single occasions, between 6 and 20 April 2015. These are the first specimens observed in the area since moving there in 2002. All flew rapidly close to the ground without stopping and appeared to be travelling in a generally southern direction. Also encountered regularly over the past decade near Imbil, where it appears to be established with males exhibiting a rapid low flight but often alighting on the ground (unlike the Pomona specimens).

Anthene lycaenoides godeffroyi (Semper) (Lepidoptera: Lycaenidae). – A further female was observed and positively identified at Buderim on 3 May 2015.

MAYO, R. – Recent observations of butterfly species rarely encountered in southern Queensland. – Volume **43**(3): 50 (May 2015).